

Sprint 2

Software- Created device in the IoT Watson Platform, workflow for IoT Scenarios using Local Node

Date	11-11-2022
Team ID	PNT2022TMID04650
Project Name	Project – Smart Farmer-IoT Enabled smart Farming Application

Program:

```
#include <Adafruit_LiquidCrystal.h> //Includes the library for LCD Display
```

```
#include <Wire.h> //Includes the library for connections
```

```
#include <Servo.h> //Includes the library for Servo Motor
```

```
Servo s;
```

```
int e = 4;
```

```
int t= 5;
```

```
int r =12;
```

```
int b =11;
```

```
int g = 10;
```

```
int sec= 0;
```

```
int Sensor = 0;
```

```
int soil = 0;
```

```
int motorPin= 9;
```

```
Adafruit_LiquidCrystal lcd(0);
```

```
void setup()
```

```
{
```

```
    Wire.begin();
```

```
    pinMode(A0, INPUT); // Temperature Sensor
```

```
    pinMode(A1, INPUT); // Soil Moisture Sensor
```

```
    pinMode(t, OUTPUT); // Ultra sonic Trigger
```

```

    pinMode(e, INPUT);           // Ultra sonic Echo
    pinMode(b, OUTPUT);          // GREEN light for LED
    pinMode(g, OUTPUT);          // BLUE light for LED
    pinMode(r, OUTPUT);          // RED light for LED
    pinMode(motorPin, OUTPUT);   // DC motor
    s.attach(3);                 // Servo Motor
    lcd.begin(16, 2);            // LCD 16x2 Display
    lcd.setBacklight(0);
    Serial.begin(9600);
}

```

```

float readDistanceCM()
{
    digitalWrite(t, LOW);
    delayMicroseconds(2);    digitalWrite(t,
    HIGH); delayMicroseconds(10);

    digitalWrite(t, LOW); int
    duration = pulseIn(e, HIGH);
    return duration * 0.034 / 2;
}

```

```

void loop()
{
    // Soil Moisture:
    Sensor = analogRead(A1);    //
    Reads data from Soil Moisture    sensor
    soil = map(Sensor, 0, 1023, 0, 117);
}

```

// Low analog value indicates HIGH moisture level and High analog value indicates LOW moisture level

// data = map(analogValue,fromLOW,fromHIGH,toLOW,toHIGH)

Serial.print("Soil Moisture value:");

Serial.println(soil);

//'data = 0' indicates total wetness and 'data = 100' indicates total dryness

// Temperature: double a = analogRead(A0); // Reads data from
Temperature sensor double t = (((a / 1024) * 5) - 0.5) * 100;

Serial.print("Temperature value:"); //Temperature value in Celsius
Serial.println(t);

// Ultrasonic sensor: float distance = readDistanceCM(); //Reads
data from Ultrasonic sensor

Serial.print("Measured distance: ");
Serial.println(readDistanceCM());

// LCD Display: lcd.setBacklight(1); //ON the
background light in LCD lcd.clear();

// Conditions:

/*If the temperature is Greater than 20 and less than 35 and also the moisture of soil is less than 60 then the GREEN light will be turned ON indicating the Normal condition */ if (t >= 20 && t < 35 && soil >= 40 && soil < 50)

{

digitalWrite(b, 0);

digitalWrite(g, 1);

digitalWrite(r, 0); s.write(90);

```

digitalWrite(motorPin, HIGH);
lcd.setCursor(3, 0);
lcd.print("ON MOTOR");
delay(1000);    lcd.clear();
    Serial.println("Water Partially Flows");
}

```

/*If the temperature is Greater than 35 and less than 45, then the BLUE light will be turned ON indicating the Intermediate risk condition due to slightly warm weather */

```

    else if (t >= 35 && t < 45)
    {
        digitalWrite(b, 1);
digitalWrite(g, 0);
digitalWrite(r, 0);    s.write(90);
digitalWrite(motorPin, HIGH);
lcd.setCursor(3, 0);
lcd.print("ON MOTOR");
delay(1000);    lcd.clear();
        Serial.println("Water Partially Flows");
    }

```

/*If the temperature is Greater than 45 or the moisture of soil is less than 30, then the RED light will be turned ON indicating the Critical condition due to highly warm weather or the low moisture content in soil */ **else if (t >= 45 || soil < 30)**

```

{

```

```

    digitalWrite(b, 0);
digitalWrite(g, 0);
digitalWrite(r, 1);    s.write(180);
    digitalWrite(motorPin, HIGH);
Serial.println("Water Fully Flows");
lcd.setCursor(2, 0);    lcd.print("ON
MOTOR!!!");
    lcd.setCursor(3, 1);
    lcd.print("Low Water");
delay(1000);    lcd.clear();
}

```

/*If the level of water is MORE in the field it will be indicated by distance sensor for less than 10cm and also the moisture of soil is greater than 80, then the YELLOW light will be turned ON indicating the high water level */

```

else if (distance<10 && soil> 80)
{
    digitalWrite(b, 0);
digitalWrite(g, 1);
digitalWrite(r, 1);    s.write(0);
    digitalWrite(motorPin, LOW);
Serial.println("Water Does Not Flow");
lcd.clear();    lcd.setCursor(3, 0);
lcd.print("OFF MOTOR");
delay(1000);    lcd.clear();
lcd.setCursor(1, 0);lcd.print("DRAIN
WATER!!!");    delay(1000);
lcd.clear();

```

```
}
```

```
else
```

```
{
```

```
    digitalWrite(b, 1);
```

```
digitalWrite(g, 1);
```

```
digitalWrite(r, 0);    s.write(0);
```

```
    digitalWrite(motorPin, LOW);
```

```
lcd.setCursor(3, 0);
```

```
lcd.print("OFF MOTOR");
```

```
delay(1000);    lcd.clear();
```

```
    Serial.println("Water Does Not Flow");
```

```
}
```

```
    lcd.setCursor(0, 0);
```

```
lcd.print("Temp:");
```

```
lcd.print(t);
```

```
lcd.print("degree");
```

```
lcd.setCursor(0, 1);
```

```
lcd.print("SoilWetness:");
```

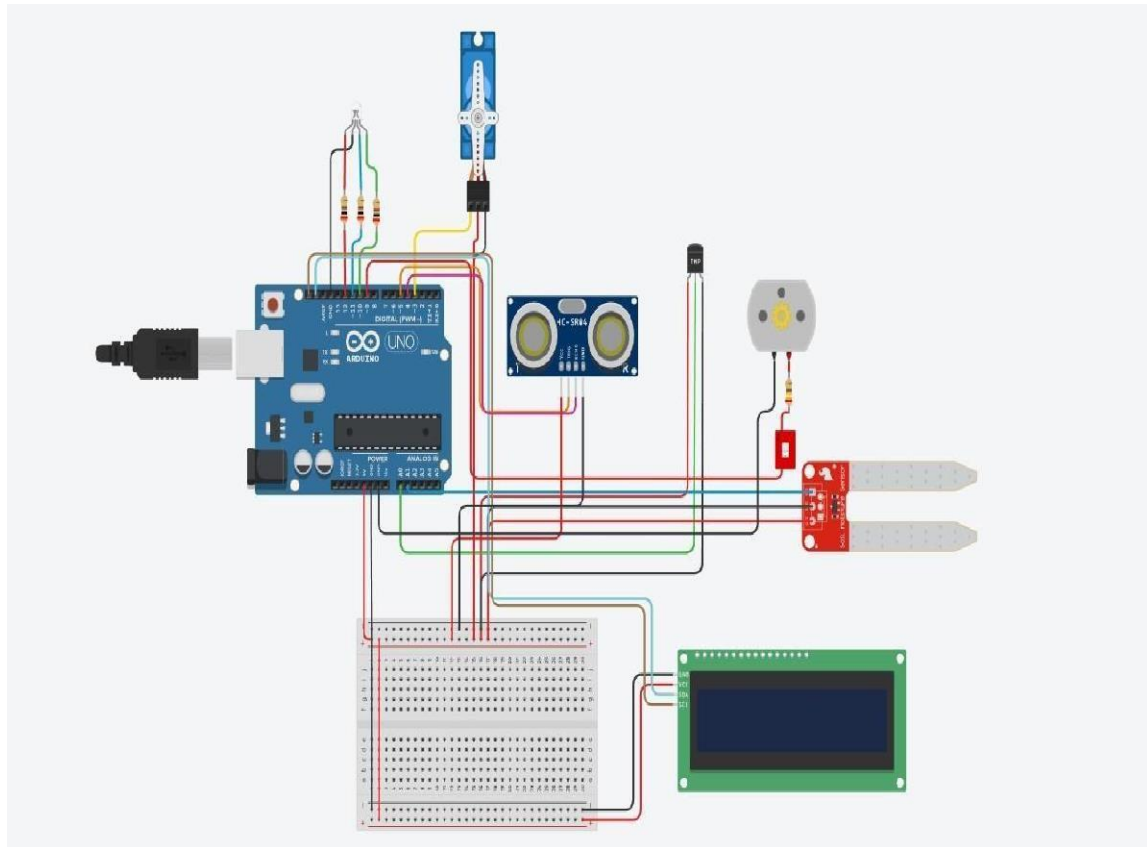
```
lcd.print(soil);    lcd.print("%");
```

```
    Serial.println(" ----- ");
```

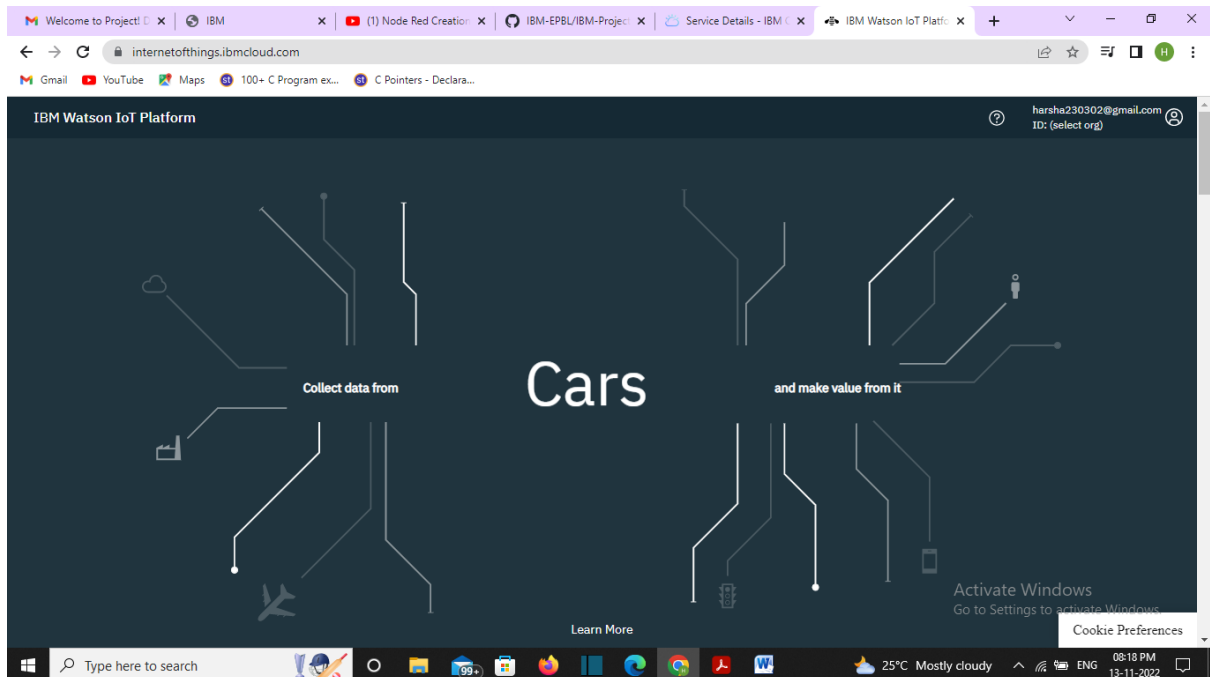
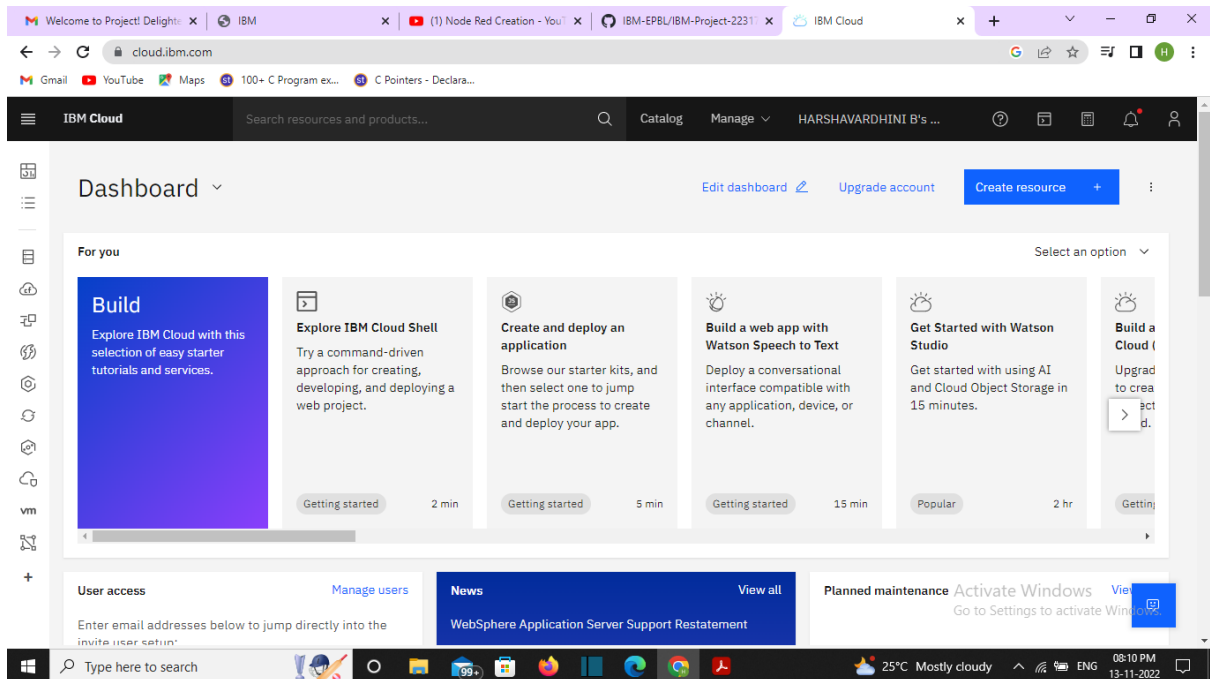
```
delay(1000);
```

```
}
```

Circuit Diagram:



Launch IBM Watson IoT Platform:



Steps to configure:

- Create an account in IBM cloud using your email ID
- Create IBM Watson Platform in services in your IBM cloud account
- Launch the IBM Watson IoT Platform
- Create a new device
- Give credentials like device type, device ID, Auth. Token
- Create API key and store API key and token elsewhere.

Create a new device:

The screenshot displays the IBM Watson IoT Platform interface. The main heading is "Browse Devices". Below it, there are two tabs: "All Devices" (selected) and "Diagnose". A descriptive text states: "This table shows a summary of all devices that have been added. It can be filtered, organized, and searched on using different criteria. To get started, you can add devices by using the Add Device button, or by using API." Below this text is a search bar labeled "Search by Device ID" and a "Device Simulator" toggle switch. A table lists the devices:

<input type="checkbox"/>	Device ID	Status	Device Type
>	12376	Disconnected	NodeMCU

At the bottom of the table, it says "Items per page 50" and "1-1 of 1 item". The page number "1 of 1 page" is also visible. The bottom of the screenshot shows the Windows taskbar with various application icons and the system clock indicating 09:03 PM on 13-11-2022.